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## Description

### TECHNICAL FIELD

**[0001]** The present invention relates to a motor comprising an armature, a rotor and a motor casing for holding them and a method for producing the motor.

### BACKGROUND ART

**[0002]** Generally, a DC motor or a DC brushless motor is used as a motor engine for vehicles such as electric vehicles and electric scooters. Such a type of motor includes an armature, a rotor and a motor casing for holding the armature and bearings for the rotor, and the armature and the rotor are disposed on the motor casing.

**[0003]** With recent progress of the control technology and enhancement of the performance of permanent magnets, the achievement of high rotations and high torque has become possible for the aforesaid motor. As a result, problems of connection accuracy between an output shaft of a rotor and a reduction gearing, coaxiality between an armature and a rotor, and heat radiation of a coil wound around the armature have become significant issues in satisfactorily securing the performance of the motor.

**[0004]** Under the circumstances described above, it is an object of the present invention to provide a motor which can provide output more efficiently and a method for producing the motor.

**[0005]** As the motor for the aforesaid running motor engine, there is proposed, for example, Japanese Patent Application Laid-Open Publication No. Hei 10-234158 which describes an electric motor including an armature, a rotor, a control section for controlling the armature and a motor casing for holding them.

**[0006]** Thus, the motor casing is configured to hold the control section together. Therefore, it is easy to secure an installing space and to mount the motor as compared with a design that the control section is separately provided.

**[0007]** The motor used for the aforesaid running motor engine or the like needs the motor casing to have airtightness in order to prevent water and dust from entering from outside.

**[0008]** But, because the motor casing which holds the armature, the rotor and the control section is generally configured by assembling a plurality of members respectively covering the armature, the rotor and the control section, it has many joints which are in contact with outside and, therefore, a disadvantage in securing airtightness.

**[0009]** Document EP 0 420 212 discloses a gear motor for a vehicle comprising a motor casing zu and a gearing casing. The motor shaft is held by bearings fixed to the motor housing.

**[0010]** Document US-A 5 644 178 discloses a motor pump having three housing parts, which are connected

one after the other by detent members.

**[0011]** In view of the aforesaid problems, it is an object of the present invention to provide a motor having the airtightness of the motor casing improved further more.

### DISCLOSURE OF THE INVENTION

**[0012]** The invention is defined by the appended claims.

### BRIEF DESCRIPTION OF THE DRAWINGS

#### [0013]

Fig. 1 is a sectional view showing a motor according to an embodiment of the present invention;  
 Fig. 2 is a sectional view showing important portions of a motor casing and an armature according to the embodiment of the present invention;  
 Fig. 3 is a sectional view showing a motor according to an embodiment of the present invention;  
 Fig. 4 is a sectional view showing a motor according to the embodiment of the present invention;  
 Fig. 5 is a sectional view showing a motor according to an embodiment of the present invention;  
 Fig. 6 is an explanatory diagram showing a method for producing a motor according to the embodiment of the present invention;  
 Fig. 7 is a side view showing a motor according to an embodiment of the present invention;  
 Fig. 8 is a side sectional view showing a motor according to the embodiment of the present invention; and  
 Fig. 9 is a front view showing a first casing member and a second casing member according to the embodiment of the present invention.

### BEST MODE FOR CARRYING OUT THE INVENTION

**[0014]** Embodiments of the present invention will be described in detail with reference to the accompanying drawings.

**[0015]** As shown in Fig. 1, a motor 1 of this embodiment is a DC brushless motor configuring a motor engine for vehicles and comprises an armature 2, a rotor 3 which rotates inside the armature 2, a motor casing 5 which holds the armature 2 and bearings 4, 4 for the rotor 3, a reduction gearing 6 consisting of a train of gears and connected to an output shaft 3a of the rotor 3, and a reduction gearing casing 7 for holding the reduction gearing 6. In the drawing, 2a indicates a coil wound around the armature 2.

**[0016]** The motor 1 has an unillustrated battery as its power source, and it is configured that its output shaft 3a has the number of revolutions of about 100,00 [rpm] and can output torque of about nine [Newton] by controlling a weak field.

**[0017]** As shown in the same drawing, the motor cas-

ing 5 and the reduction gearing casing 7 are integrally formed, and a portion shared by these casings is provided with a hole 8 through which the output shaft 3a extends from the motor casing 5 side to the reduction gearing casing 7 side. And, lubrication oil 9 filling the reduction gearing casing 7.

[0018] The reduction gearing 6 is configured by providing a plurality of mutually meshed gears, and its output portion 6a is protruded from an essential portion of the reduction gearing casing 7 where an oil seal 10' is placed to seal the lubrication oil 9. Smoothness of the reduction gearing 6 can be secured by the lubrication oil 9.

[0019] The motor casing 5 and the reduction gearing casing 7 are configured by bolting a pair of members 5a, 5a, which form a cylindrical interior, with a member 7a which is fitted to the members 5a, 5a.

[0020] As shown in Fig. 2, the armature 2 is fitted between stepped portions A and A which are respectively formed on the pair of members 5a, 5a.

[0021] One of the bearings 4, 4 for the rotor 3 and an oil seal 10 for sealing the lubrication oil 9 are disposed in the hole 8, and this bearing 4 is immersed in the lubrication oil 9. The other bearings 4, 4 are respectively disposed in appropriate positions of the motor casing 5 and the reduction gearing casing 7, and these in the motor casing 5 are greased for lubrication.

[0022] Specifically, the bearing 4 placed in the hole 8 receives a relatively large load when torque is transmitted, so that it is designed to be somewhat larger than the other bearings 4, 4 and immersed in the lubrication oil 9 so to operate smoothly.

[0023] As described above, the motor of this embodiment has the reduction gearing consisting of the train of gears and connected to the output shaft of the rotor and the reduction gearing casing for holding the reduction gearing, the motor casing and the reduction gearing casing are integrally formed, the hole is formed on the portion shared by these casings, through which the output shaft extends from the motor casing side to the reduction gearing casing side, and the lubrication oil is filling in the reduction gearing casing. Thus, the armature, the rotor, the bearing and the reduction gearing can be disposed accurately, smoothness of the reduction gearing and the bearings can be secured by the lubrication oil, and the motor output can be obtained more efficiently.

[0024] If the motor casing and the reduction gearing casing are separate bodies, the number of components increases, resulting in the increase of manufacturing costs. And, when the output shaft and the reduction gearing are mutually connected, their mounting positions and angles tend to be slightly misaligned. Thus, power might be lowered, but such drawbacks can be avoided by this embodiment without fail.

[0025] In the motor of this embodiment, the bearing for the rotor and the oil seal for sealing the lubrication oil are disposed in the hole, and the bearing is immersed

in the lubrication oil. Accordingly, smoothness of the bearing for the rotor can be secured by the lubrication oil which fills in the reduction gearing casing.

[0026] Then, a second embodiment of the present invention will be described with reference to Fig. 3 and Fig. 4. This motor has the same basic structure as that of the motor described in the aforesaid embodiment, so that like reference numerals are used for the common members, and their descriptions are omitted.

[0027] As shown in Fig. 3, the motor casing 5 of this embodiment comprises a plurality of members 5a, 5a which are assembled, and the members 5a, 5a are configured to support the bearing 4 and the inner diameter part of the armature 2.

[0028] Specifically, the bearing 4 and the inner diameter part of the armature 2 are respectively positioned with respect to the respective members 5a, 5a configuring the motor casing 5. As a result, the center axis of the armature 2 and the center axis of the rotor 3 are aligned accurately.

[0029] A reduction gearing may be fitted to the output shaft 3a of the rotor 3 in the same way as in the aforesaid embodiment.

[0030] Fig. 3 shows an example that the armature 2 is thoroughly housed in the motor casing 5, but as shown in Fig. 4, the outer diameter part of the armature 2 may be exposed to the outside of the motor casing 5. The motor casing 5 shown in Fig. 4 is assembled by having the leading ends of bolts 5b and 5b, which are inserted through one of the members 5a, 5a, screwed with the other member 5a.

[0031] As described above, in the motor of this embodiment, the motor casing is configured by assembling a plurality of members, and at least one of the plurality of members supports the bearing and the inner diameter part of the armature. Therefore, the center axis of the armature and the center axis of the rotor can be aligned accurately, and power of the motor can be obtained more efficiently.

[0032] In other words, when the plurality of members are assembled to form the motor casing, clearances and dimensional errors of the respective members are accumulated, possibly degrading the coaxiality between the armature and the rotor and adversely effecting on the motor performance. But, such drawbacks can be avoided without fail because at least one of the members of this embodiment supports the bearing and the inner diameter part of the armature.

[0033] Then, a third embodiment of the present invention will be described with reference to Fig. 5 and Fig. 6. This motor has the same basic structure as that of the motor described in the aforesaid embodiment. Therefore, like reference numerals are used for the common members, and their descriptions are omitted.

[0034] As shown in Fig. 5, the motor 1 of this embodiment has a resin 11 charged into and cured in the motor casing 5 so to adhere the resin 11 to the coil 2a of the armature 2 and the inner surface of the motor casing 5.

In the drawing, 12 indicates a rotation sensor for detecting a rotation position of the rotor 3.

**[0035]** The resin 11 is preferably to be a resin capable of improving heat radiation of the coil 2a. Specifically, silicon based resin or epoxy based resin, which is a high heat conductive and uncured hardening resin, is optimum. As the silicon based resin, commercially available two-part silicon potting agents (e.g., Three Bond 1230 etc. manufactured by Three Bond Co., Ltd.) are suitable. And, as the epoxy based resin, a one-can epoxy-blended resin (e.g., Three Bond 2200 Series etc. manufactured by Three Bond Co., Ltd.) is suitable.

**[0036]** For the two-part silicon potting agent, a silicon resin and a hardening agent are generally provided separately. Therefore, the silicon potting agent cures at room temperature by mixing the silicon resin and the curing agent immediately before charging them into the motor casing 5. By appropriately heating as required, hardening time can be decreased, and hardening and adhesion can be effected more efficiently.

**[0037]** On the other hand, the one-can epoxy-blended resin has a relatively low viscosity, so that it can be adhered to the inner surface of the motor casing 5 by charging it into the motor casing 5 and heat hardening.

**[0038]** The resin used in this embodiment has been described with reference to the two types of resins as above. It is to be understood, however, that the resins used by the invention are not limited to the aforesaid resins but other appropriate resins may be used.

**[0039]** To charge the resin 11 into the motor casing 5, a core 13 for securing a space, in which the rotor 3 and the rotation sensor 12 are disposed, is inserted into the motor casing 5 as shown in Fig. 6.

**[0040]** The resin 11 is charged through a hole 14 formed on the motor casing 5 as indicated by an arrow in the same drawing. This hole is formed by one or two or more at appropriate positions.

**[0041]** And, the rotor 3, the rotation sensor 12 and one of the members 5a configuring the motor casing 5 are disposed after curing the resin 11 and removing the core. The member 5a disposed here closes an opening for putting in and out of the core 13, and especially the bearing 4 for the rotor 3 is disposed in it, and the output shaft 3a of the rotor 3 is placed through it.

**[0042]** The reduction gearing may be mounted to the output shaft 3a of the rotor 3 as described in the aforesaid embodiment. And, the same resin as used in the aforesaid embodiment may be used.

**[0043]** As described above, in the motor of this embodiment, the resin is charged into and cured in the motor casing to adhere to the coil of the armature and the inner surface of the motor casing. Therefore, the heat radiation of the coil of the armature can be secured satisfactorily. As a result, power of the motor can be obtained more efficiently.

**[0044]** Especially, when the resin is disposed to secure the heat radiation of the coil of the armature, a metal mold corresponding to the inner surface of the motor

casing was conventionally used to form the resin around the coil of the armature, and the formed unit was fitted to the motor casing. Therefore, adhesion between the resin and the inner surface of the motor casing was poor, and its heat radiation was insufficient. Therefore, this embodiment charges the resin into and cures it in the motor casing, so that the resin and the inner surface of the motor casing can be adhered securely, and heat radiation can be improved. And, the conventional metal mold is not needed to form the resin.

**[0045]** According to the method for producing the motor of this embodiment, the resin is charged into and cured in the motor casing to adhere the resin to the coil of the armature and the inner surface of the motor casing, so that the heat radiation of the coil of the armature can be secured satisfactorily. As a result, power of the motor can be obtained more efficiently.

**[0046]** Besides, according to the method for producing the motor of this embodiment, to charge the resin into the motor casing, the core for securing the space, in which the rotor is disposed, is inserted into the motor casing, so that the rotor and the resin can be disposed efficiently.

**[0047]** In addition, according to the method for producing the motor of this embodiment, the motor is provided with a rotation sensor for detecting a rotation position of the rotor, and the core secures the space for disposing the rotation sensor. Thus, the rotation sensor can be disposed efficiently.

**[0048]** Then, a fourth embodiment of the present invention will be described in detail with reference to the drawings.

**[0049]** As shown in Fig. 7 to Fig. 9, the motor 1 of this embodiment is a DC motor or DC brushless motor, which is used for a motor engine for running and comprises the armature 2, the rotor 3 and a control section 40 for controlling the armature 2 held in the motor casing 5.

**[0050]** The armature 2 is provided around the rotor 3 with a small space between them, and the rotor 3 is rotated around an output shaft 310 supported by a bearing 320 when commutation is caused in a coil 210 of the armature 2 by the control section 40.

**[0051]** The motor casing 5 of this embodiment comprises a plurality of casing members formed of aluminum alloy or hard resin, and has a first casing member 510 and a second casing member 520 which cover the armature 2 and the rotor 3 with the bearing 320 respectively disposed, and a third casing member 530 for covering the control section 40.

**[0052]** And, the outer shell of the motor 1 is configured by assembling the first casing member and the third casing member, and its inside is divided by assembling the first casing member and the second casing member.

**[0053]** In this embodiment, the respective casing members 510, 520, 530 are assembled by screwing.

**[0054]** In the drawings, 540 indicates a turn stop member for preventing the first casing member 510 and

the second casing member 520 from displacing.

[0055] Specifically, the motor 1 is formed by fitting the armature 2 having a substantially cylindrical shape into the first casing member 510, disposing the armature 3 at its center, screwing the first casing member 510 and the second casing member 520, disposing the control section 40 between the second casing member 520 and the third casing member 530, and screwing the first casing member 510 and the third casing member 530.

[0056] Coaxiality between the armature 2 and the rotor 3 is accurately maintained when the armature 2 is held in position between the first casing member 510 and the second casing member 520 and the output shaft 310 of the rotor 3 is supported by the bearings 320 disposed in the first casing member 510 and the second casing member 520.

[0057] The output shaft 310 of the rotor 3 is exposed from an opening 512 of the first casing member 510 and connected to outside.

[0058] And, seating surfaces 511, 531 which are designed to contact mutually are respectively formed on the ends of the first casing member 510 and the third casing member 530.

[0059] The seating surfaces 511, 531 are perpendicularly formed with respect to a direction in which the first casing member 510 and the third casing member 530 are screwed so to be mutually attached by pressure. Therefore, airtightness of the motor casing 5 can be secured without fail.

[0060] To secure the airtightness of the motor casing 5 more reliably, a groove or a stepped portion may be formed on the respective seating surfaces 511, 531 to mount a gasket, an O-ring or the like.

[0061] For the heat radiation of the motor 1, fins 501 for heat radiation are formed at appropriate positions of the casing 5, and a resin material 220 is placed around the coil 210 of the armature 2 to fill a space between the armature 2 and the casing 5. The resin material 220 is solidified to shape by using a predetermined metal mold. Otherwise, it may be designed to form by injecting the resin into the casing 5 without using a metal mold. The resin material may be the same one as used in the afore-said embodiment.

[0062] The control section 40 of this embodiment comprises a control circuit 410 to output a control signal according to an instruction transmitted from outside and a drive circuit 420 for supplying power to the armature 2 according to the control signal. The control circuit 410 is mounted on a substrate 411 supported by the second casing member 520, and the drive circuit 420 is mounted on a substrate 421 supported by the third casing member 530.

[0063] Wiring 60 for connecting the armature 2 with the drive circuit 421 of the control section 40 is passed through a notched through section 521 provided on the second casing member 520.

[0064] A plurality of projections 522 for supporting the substrate 411 of the control circuit 410 are formed on

the second casing member 520, and the substrate 411 is supported by being screwed to the respective projections 522.

[0065] Besides, the control circuit 410 is connected to a sensor 70 for detecting a position of the rotor 3, and a control signal is output according to the position of the rotor 3 detected by the sensor 70. The sensor 70 has a ring shape to be inserted over the output shaft 310 of the rotor 3 and screwed to the second casing member 520.

[0066] As described above, in the motor of this embodiment, the motor casing has the first casing member and the second casing member for covering the armature and the rotor and respectively provided with the bearing for the rotor and the third casing member for covering the control section. The first casing member and the third casing member are assembled to form the outer shell of the motor, and the first casing member and the second casing member are assembled to divide the inside of the motor. And, the seating surfaces which are designed to contact mutually are respectively formed on the ends of the first casing member and the third casing member, so that the airtightness of the motor casing can be improved further more.

[0067] Specifically, the motor casing for holding the armature, the rotor and the control section is configured by assembling a plurality of members which respectively cover the armature, the rotor and the control, so that there are many joints which are exposed to outside, and it is disadvantageous in view of securing airtightness. In this embodiment, however, the joint between the first casing member and the second casing member is located inside of the joint between the first casing member and the third casing member, so that airtightness can be secured relatively easily.

[0068] And, the first casing member and the third casing member can be assembled accurately by virtue of the seating surfaces respectively formed thereon, and a gap in the joint can be eliminated completely.

[0069] Besides, in the motor of this embodiment, the through section, through which the wiring for connecting the armature and the control section is passed through, is placed in the second casing member, so that the wiring for connecting the armature and the control section within the motor casing can be disposed efficiently.

[0070] In addition, in the motor of this embodiment, the substrate of the control section is supported by the second casing member, so that the control section can be arranged efficiently in the motor casing.

[0071] Furthermore, in the motor of this embodiment, the sensor for detecting a position of the rotor is supported by the second casing member, so that the sensor for detecting a position of the rotor can be disposed efficiently in the motor casing.

## INDUSTRIAL APPLICABILITY

[0072] The present invention can improve connection

accuracy of the output shaft of the rotor with the reduction gearing, the coaxiality between the armature and the rotor, and the heat radiation of the coil wound around the armature in a motor of high rotations and high torque, and it is especially suitable as a motor for electric vehicles.

## Claims

1. A drive System for an electric vehicle comprising an armature (2), a rotor (3) and an electric motor including a motor casing (5) for holding an output shaft (3a) of the rotor (3); a reduction gearing (6) including reduction gears connected to the output shaft (3a); and a reduction gearing casing (7) which contains therein the reduction gears, the reduction gearing casing (7) holds an output section of the reduction gears, and the inside of the casing (7) being filled with a lubricating oil (9), wherein
  - the reduction gearing (6) is provided between the motor casing (5) and the reduction gearing casing (7),
  - the motor casing (5) includes a hole (14) formed to be recessed in a direction of the rotor (3) and a holding section for holding the output section of the reduction gears,
  - the reduction gears are consisting of a train of gears connected to the output shaft (3a) of the rotor (3),
  - the output shaft (3a) of the rotor (3) is provided with the train of gears such that the forward end of the shaft (3a) extending from the base end of the gear train is held in the holding section of the reduction gearing casing (7), and the rear end of the shaft (3a) is held in the hole (14) of the motor casing (5);
  - the output section of the reduction gears is provided with the train of gears such that the rear end of the output section extending from a gear of the forward end of the gear train is held in the holding section of the motor casing (5) and the output side is held in the hole of the reduction gearing casing (7); and
  - a bearing is provided an each of the holding sections respectively holding the output shaft (3a) of the rotor (3) and the output section of the reduction gears, and each of the holes is provided with a bearing and an oil seal (10'),

**characterized in that**

  - them reduction gearing casing (7) includes a holding section for holding the output shaft (3a) of the rotor (3) and a hole (8) through the output section of the reduction gears.
2. A drive system according to Claim 1, the motor casing (5) comprising a curable resin (11) having a high thermal conduction which is cured and adhered to a coil (2a) of the armature (2) and the inner surface

of the motor casing (5).

3. A DC motor (1) or a DC brushless motor (1) for an electric vehicle comprising an armature (2), a rotor (3), a control section (40) for controlling the armature (2), and a motor casing (5) for holding them, wherein
  - the motor casing (5) includes a first casing member (510) and a second casing member (520) which cover the armature (2) and the rotor (3) and are respectively provided with bearings (320), and a third casing member (530) for covering the control section (40);
  - the first casing member (510) and the second casing member (520) each having a curable resin (220) having a high thermal conduction disposed therein, and a detent member is provided between the first casing member (510) and the second casing member (520) to prevent displacement thereof from one another;
  - the armature (2) is placed in the first casing member (510), and the first casing member (510) and the second casing member (520) are secured by a screw;
  - the control section (40) is arranged between the second casing member (520) and the third casing member (530),

**characterized in that**

  - seating surfaces to be mutually contacted are respectively formed along the peripheries of the edges of the first casing member (510) and the third casing member (530); and
  - the seating surfaces formed along the peripheral edges of the first casing member (510) and the third casing member (530) are brought into contact with each other, and the first casing member (510) and the third casing member (530) are screwed so as to be in pressure contact with each other to secure the sealing thereof.
4. A motor (1) for an electric vehicle according to claim 3, wherein the second casing member (520) is provided with a through-hole into which a wiring (60) is inserted to connect the armature (2) and the control section (40).
5. A motor (1) for an electric vehicle according to Claim 3 or 4, wherein the second casing member (520) supports a Substrate (421) of the control section (40).
6. A motor (1) for an electric vehicle according to any one of Claims 3 to 5, wherein the second casing member (520) supports a rotation sensor (70) for detecting the position of the rotor (3).

## Patentansprüche

1. Antriebssystem für ein elektrisches Kraftfahrzeug, umfassend einen Anker (2), einen Rotor (3) sowie einen elektrischen Motor mit einem Motorgehäuse (5) zum Halten einer Ausgabewelle (3a) des Rotors (3); ein Untersetzungsgetriebe (6), welches Untersetzungs-Zahnräder beinhaltet, die mit der Ausgabewelle (3a) verbunden sind; und ein Gehäuse (7) für das Untersetzungsgetriebe, welches darin die Untersetzungs-Zahnräder enthält, wobei das Gehäuse (7) für das Untersetzungsgetriebe einen Ausgabeabschnitt der Untersetzungs-Zahnräder hält und das Innere des Gehäuses (7) mit einem Schmieröl (9) befüllt ist, wobei

das Untersetzungsgetriebe (6) zwischen dem Motorgehäuse (5) und dem Gehäuse (7) für das Untersetzungsgetriebe vorgesehen ist,

das Motorgehäuse (5) ein Loch (14) beinhaltet, welches so ausgeformt ist, dass es in einer Richtung des Rotors (3) vertieft ist, sowie einen Halteabschnitt zum Halten des Ausgabeabschnitts der Untersetzungs-Zahnräder beinhaltet,

wobei die Untersetzungs-Zahnräder aus einem Zug von Zahnradern bestehen, die mit der Ausgabewelle (3a) des Rotors (3) verbunden sind,

die Ausgabewelle (3a) des Rotors (3) mit dem Zug von Zahnradern derart versehen ist, dass das vordere Ende der Welle (3a), welches sich von dem Basisende des Zahnrad-Zugs erstreckt, in dem Halteabschnitt des Gehäuses (7) für das Untersetzungsgetriebe gehalten wird und das rückwärtige Ende der Welle (3a) in dem Loch (14) des Motorgehäuses (5) gehalten wird;

wobei der Ausgabeabschnitt der Untersetzungs-Zahnräder mit dem Zug von Zahnradern derart versehen ist, dass das rückwärtige Ende des Ausgabeabschnitts, der sich von einem Zahnrad des vorderen Endes des Zahnrad-Zugs erstreckt, in dem Halteabschnitt des Motorgehäuses (5) gehalten wird und die Ausgabeseite in dem Loch des Gehäuses (7) für das Untersetzungs-Getriebe gehalten wird; und

ein Lager an jedem der Halteabschnitte vorgesehen ist, welches jeweils die Ausgabewelle (3a) des Rotors (3) und den Ausgabeabschnitt der Untersetzungs-Zahnräder hält, und jedes der Löcher mit einem Lager und einer Öldichtung (10') versehen ist,

**dadurch gekennzeichnet, dass**

das Gehäuse (7) für das Untersetzungs-Getriebe einen Halteabschnitt zum Halten der Ausgabewelle (3a) des Rotors (3) sowie ein Loch (8) durch den Ausgabeabschnitt der Untersetzungs-Zahnräder beinhaltet.

2. Antriebssystem gemäß Anspruch 1, wobei das Motorgehäuse (5) ein aushärtbares Harz (11) umfasst,

das eine hohe thermische Leitfähigkeit aufweist und das an einer Spule (2a) des Ankers (2) und der inneren Oberfläche des Motorgehäuses (5) ausgehärtet ist und anhaftet.

3. Gleichstrom-Motor (1) oder bürstenloser Gleichstrom-Motor (1) für ein elektrisches Kraftfahrzeug, umfassend einen Anker (2), einen Rotor (3), einen Steuerabschnitt (40) zum Steuern des Ankers (2), sowie ein Motorgehäuse (5) zum Halten derselben, wobei

das Motorgehäuse (5) ein erstes Gehäuseelement (510) sowie ein zweites Gehäuseelement (520) beinhaltet, welche den Anker (2) und den Rotor (3) abdecken und jeweils mit Lagern (320) versehen sind, sowie ein drittes Gehäuseelement (530) zum Abdecken des Steuerungsabschnitts (40);

wobei das erste Gehäuseelement (510) und das zweite Gehäuseelement (520) jeweils einen darin angeordneten aushärtbaren Harz (220) mit hoher thermischer Leitfähigkeit aufweisen, und wobei ein Arretierelement zwischen dem ersten Gehäuseelement (510) und dem zweiten Gehäuseelement (520) vorgesehen ist, um eine Verschiebung derselben voneinander zu verhindern;

wobei der Anker (2) in dem ersten Gehäuseelement (510) platziert ist und das erste Gehäuseelement (510) und das zweite Gehäuseelement (520) mittels einer Schraube abgesichert sind;

wobei der Steuerungsabschnitt (40) zwischen dem zweiten Gehäuseelement (520) und dem dritten Gehäuseelement (530) angeordnet ist,

**dadurch gekennzeichnet, dass**

Auflage-Oberflächen, die miteinander in Berührung stehen, jeweils entlang der Umfänge der Kanten des ersten Gehäuseelements (510) und des dritten Gehäuseelements (530) ausgebildet sind; und

wobei die Auflage-Oberflächen, die entlang der umfänglichen Kanten des ersten Gehäuseelements (510) und des dritten Gehäuseelements (530) ausgebildet sind, in Kontakt miteinander gebracht werden und wobei das erste Gehäuseelement (510) und das dritte Gehäuseelement (530) miteinander verschraubt werden, um in Druckkontakt miteinander zu sein, um deren Abdichtung zu gewährleisten.

4. Motor (1) für ein elektrisches Kraftfahrzeug gemäß Anspruch 3, wobei das zweite Gehäuseelement (520) mit einem Durchgangsloch versehen ist, in welches eine Verdrahtung (60) eingeführt wird, um den Anker (2) und den Kontrollabschnitt (40) miteinander zu verbinden.

5. Motor (1) für ein elektrisches Kraftfahrzeug gemäß Anspruch 3 oder 4, wobei das zweite Gehäuseelement

lement (520) ein Substrat (421) des Kontrollabschnitts (40) abstützt.

6. Motor (1) für ein elektrisches Kraftfahrzeug gemäß einem der Ansprüche 3 bis 5, wobei das zweite Gehäuseelement (520) einen Rotationssensor (70) zur Detektion des Rotors (3) abstützt.

#### Revendications

1. Système d'entraînement pour un véhicule électrique comprenant une armature (2), un rotor (3) et un moteur électrique comprenant un carter de moteur (5) pour maintenir un arbre de sortie (3a) du rotor (3) ; un jeu d'engrenages de réduction (6) incluant des engrenages de réduction reliés à l'arbre de sortie (3a) ; et un carter de jeu d'engrenages de réduction (7) qui contient en son sein les engrenages de réduction, le carter de jeu d'engrenages de réduction (7) contient une section de sortie des engrenages de réduction, et l'intérieur du carter (7) étant rempli d'une huile lubrifiante (9), dans lequel
  - le jeu d'engrenages de réduction (6) est disposé entre le carter de moteur (5) et le carter de jeu d'engrenages de réduction (7),
  - le carter de moteur (5) inclut un trou (14) formé pour être en retrait dans la direction du rotor (3) et une section de maintien pour maintenir la section de sortie des engrenages de réduction,
  - les engrenages de réduction consistent en un train d'engrenages relié à l'arbre de sortie (3a) du rotor (3),
  - l'arbre de sortie (3a) du rotor (3) est muni du train d'engrenages de sorte que l'extrémité avant de l'arbre (3a) s'étendant à partir de l'extrémité de base du train d'engrenages est maintenue dans la section de maintien du carter de jeu d'engrenages de réduction (7), et l'extrémité arrière de l'arbre (3a) est maintenue dans le trou (14) du carter de moteur (5) ;
  - la section de sortie des engrenages de réduction est munie du train d'engrenages de sorte que l'extrémité arrière de la section de sortie s'étendant à partir d'un engrenage de l'extrémité avant du train d'engrenages est maintenue dans la section de maintien du carter de moteur (5) et le côté sortie est maintenu dans le trou du carter de jeu d'engrenages de réduction (7) ; et
  - un palier est prévu dans chacune des sections de maintien maintenant respectivement l'arbre de sortie (3a) du rotor (3) et la section de sortie des engrenages de réduction, et chacun des trous est muni d'un palier et d'un joint d'étanchéité à l'huile (10'),
  - caractérisé en ce que** le carter de jeu d'engrenages de réduction (7) inclut une section de maintien pour maintenir l'arbre de sortie (3a) du ro-

tor (3) et un trou (8) à travers la section de sortie des engrenages de réduction.

2. Système de commande selon la revendication 1, le carter de moteur (5) comprenant une résine pouvant être cuite (11), ayant une conduction thermique élevée, qui est cuite et rendue adhérente à une bobine (2a) de l'armature (2) et à la surface intérieure du carter de moteur (5).
3. Moteur à courant continu (1) ou moteur à courant continu sans collecteur (1) pour un véhicule électrique comprenant une armature (2), un rotor (3), une section de commande (40) pour commander l'armature (2), et un carter de moteur (5) pour les maintenir, dans lequel
  - le carter de moteur (5) inclut un premier élément de carter (510) et un deuxième élément de carter (520) qui recouvrent l'armature (2) et le rotor (3) et qui sont respectivement munis de paliers (320), et un troisième élément de carter (530) pour recouvrir la section de commande (40) ;
  - le premier élément de carter (510) et le deuxième élément de carter (520) ayant chacun une résine pouvant être cuite (220) présentant une conduction thermique élevée disposée en son sein, et un élément positionneur est disposé entre le premier élément de carter (510) et le deuxième élément de carter (520) pour empêcher le déplacement de ces derniers l'un par rapport à l'autre ;
  - l'armature (2) est placée dans le premier élément de carter (510), et le premier élément de carter (510) et le deuxième élément de carter (520) sont fixés par une vis ;
  - la section de commande (40) est agencée entre le deuxième élément de carter (520) et le troisième élément de carter (530),
  - caractérisé en ce que**
  - des surfaces d'appui à mutuellement mettre en contact sont respectivement formées le long des périphéries des bords du premier élément de carter (510) et du troisième élément de carter (530) ; et
  - les surfaces d'appui formées le long des bords périphériques du premier élément de carter (510) et du troisième élément de carter (530) sont amenées en contact l'une avec l'autre, et le premier élément de carter (510) et le troisième élément de carter (530) sont vissés afin d'être en contact de pression l'un avec l'autre pour assurer l'étanchéité de ces derniers.
4. Moteur (1) pour un véhicule électrique selon la revendication 3, dans lequel le deuxième élément de carter (520) est muni d'un trou traversant dans lequel un câblage (60) est inséré pour relier l'armature (2) et la section de commande (40).
5. Moteur (1) pour un véhicule électrique selon la re-



vention 3 ou 4, dans lequel le deuxième élément de carter (520) supporte un substrat (421) de la section de commande (40).

6. Moteur (1) pour un véhicule électrique selon l'une quelconque des revendications 3 à 5, dans lequel le deuxième élément de carter (520) supporte un capteur de rotation (70) pour détecter la position du rotor (3).

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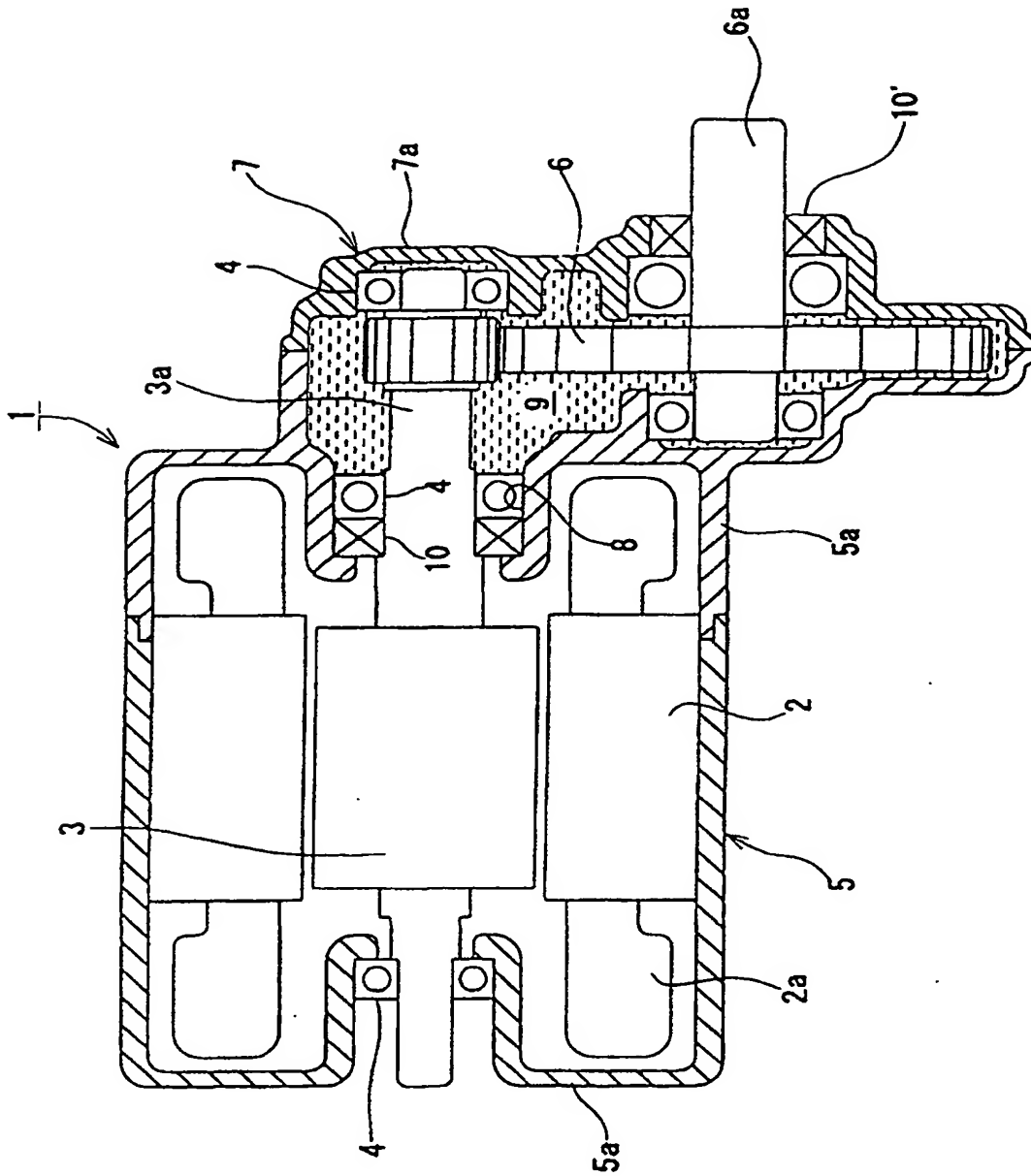
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Fig. 1



*Fig. 2*

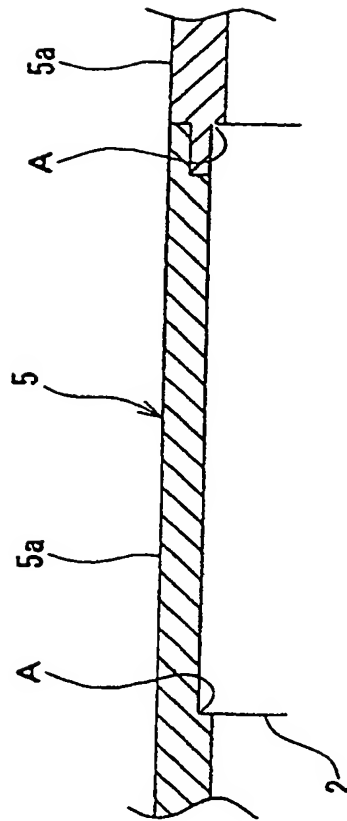


Fig. 3

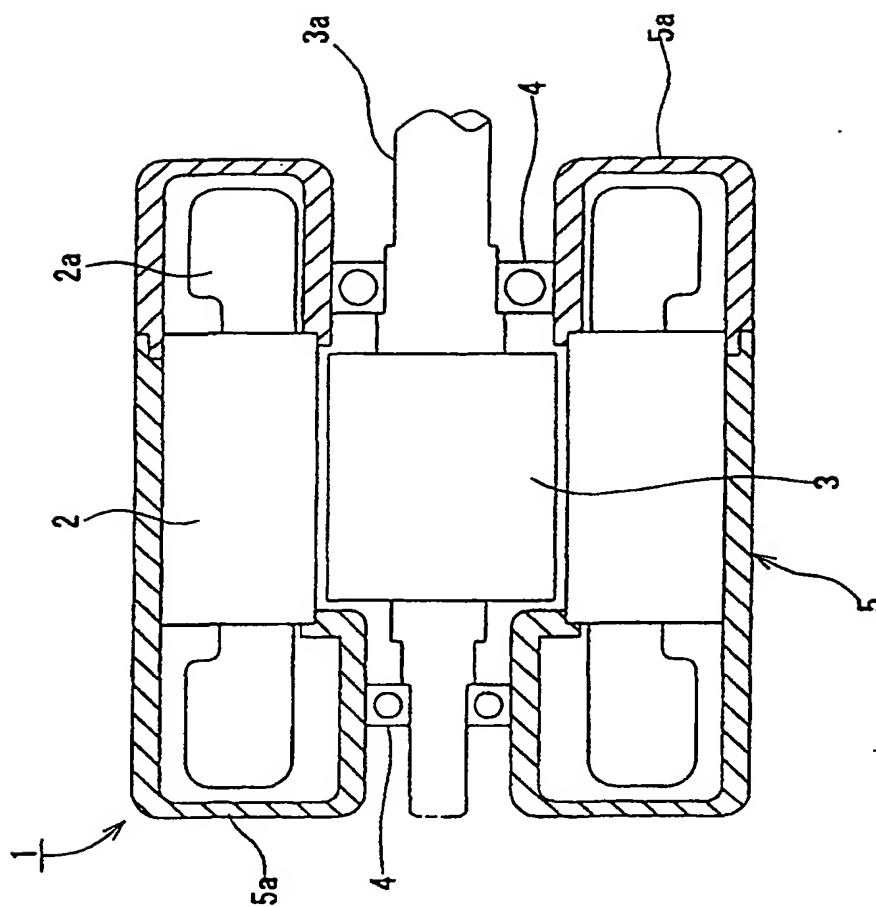


Fig. 4

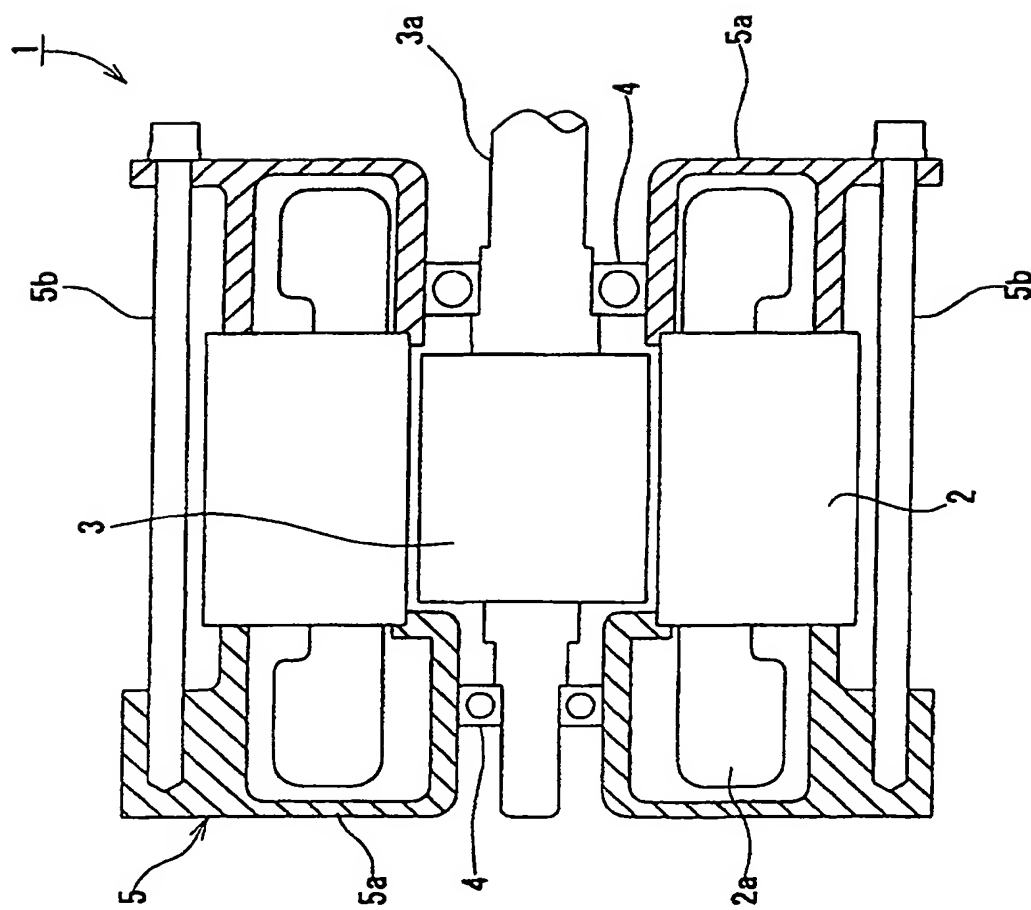


Fig. 5

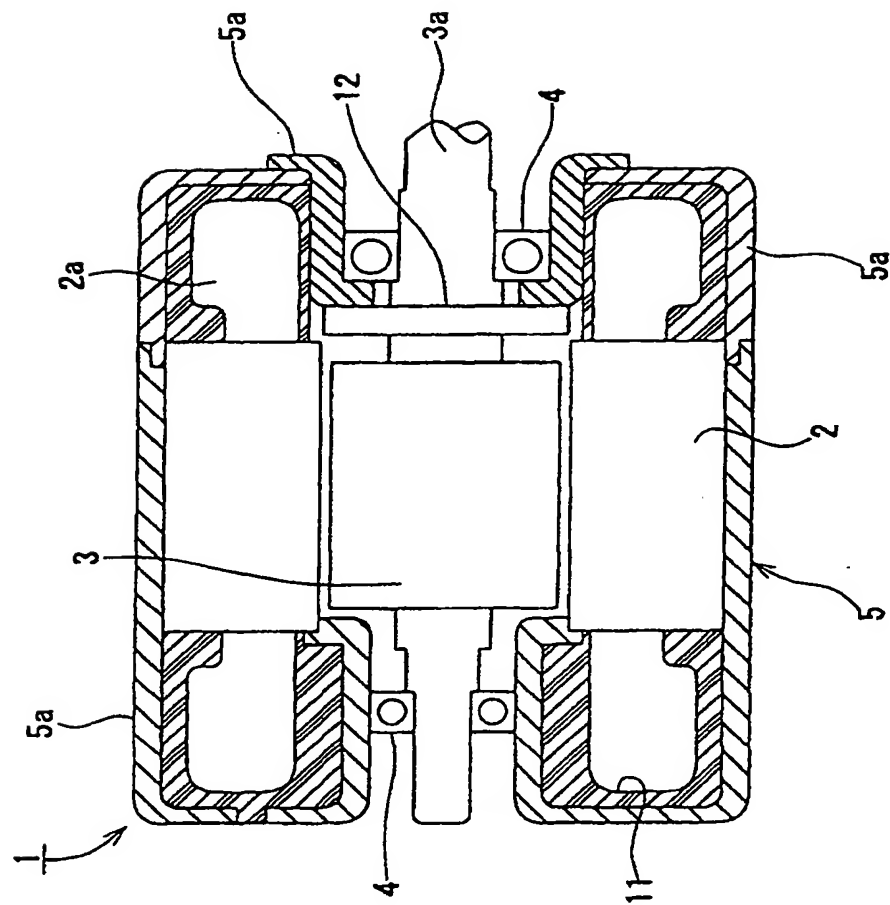


Fig. 6

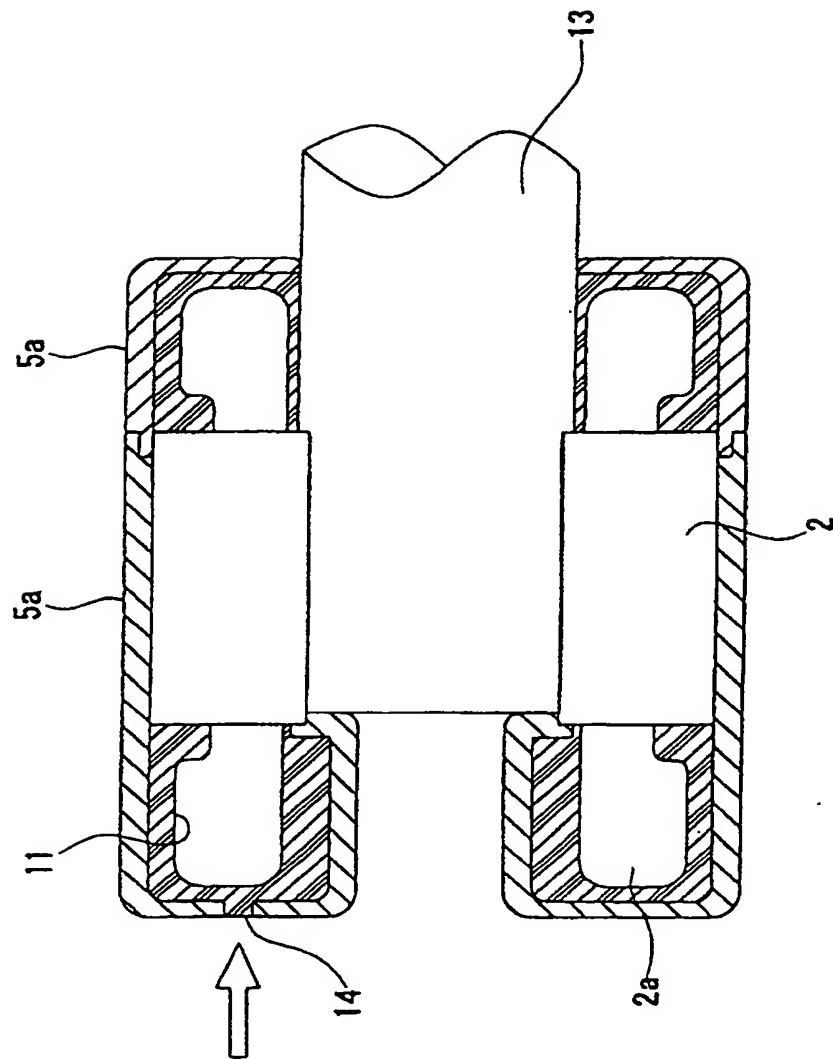


Fig. 7

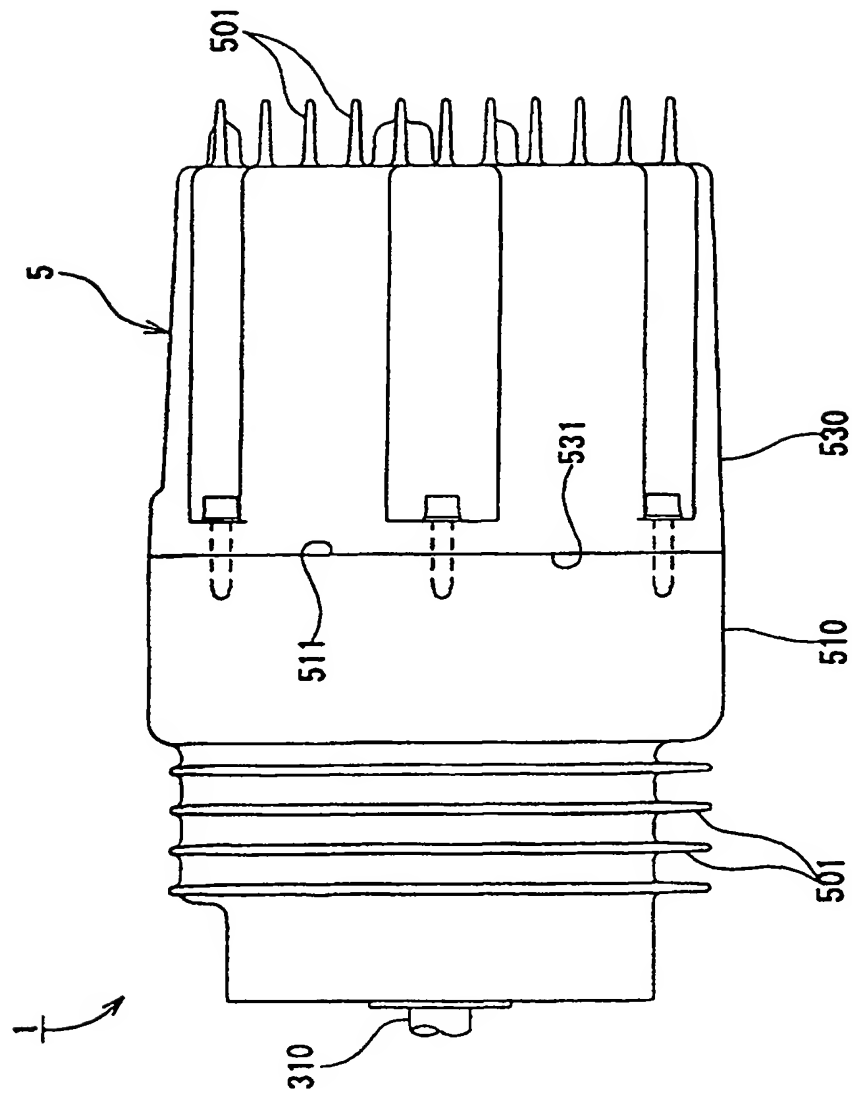




Fig. 8

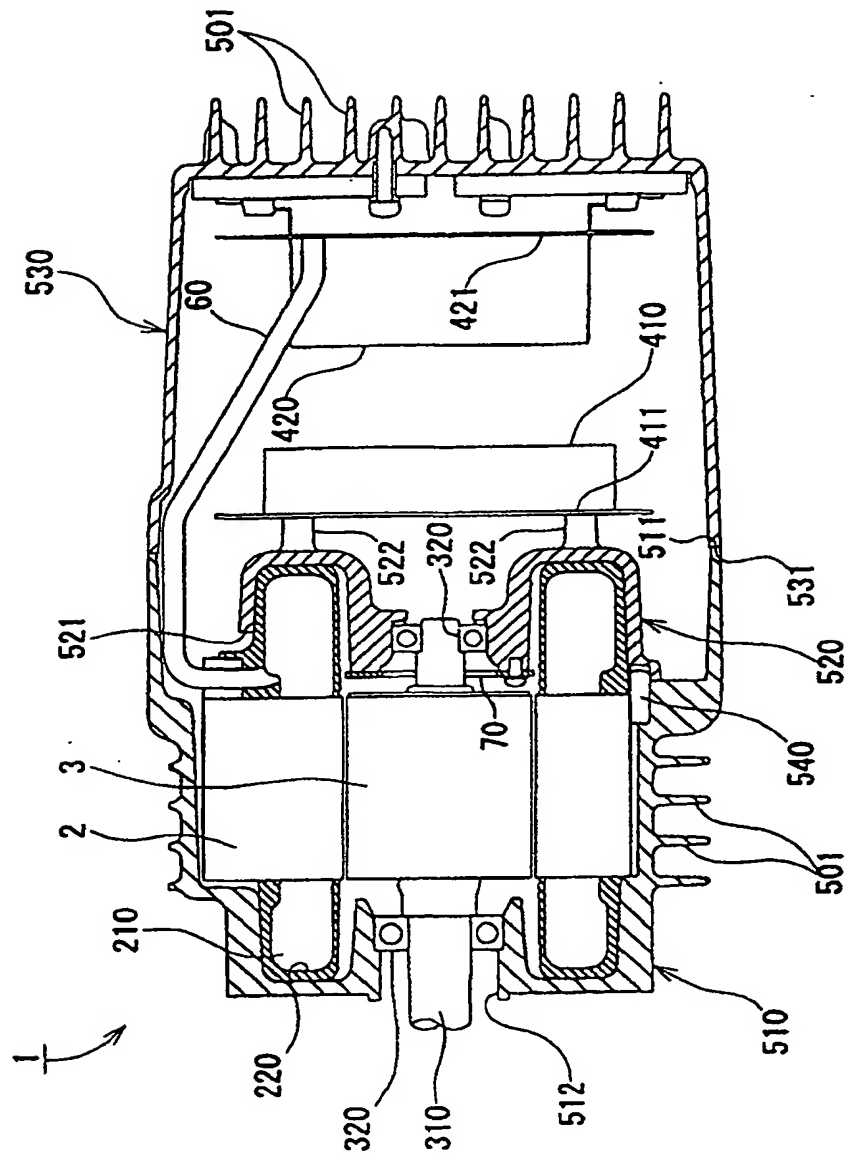


Fig. 9

